



Supplementary Materials

Impact of Wildfire Smoke on Adverse Pregnancy Outcomes in Colorado, 2007–2015

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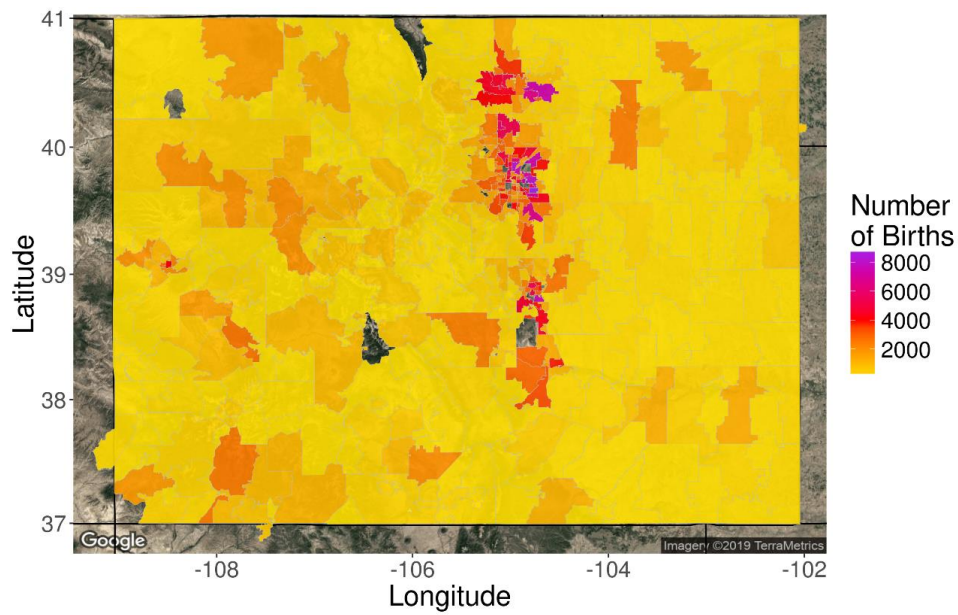


Figure S1. Map of the number of births in each ZIP code, 2007–2015.

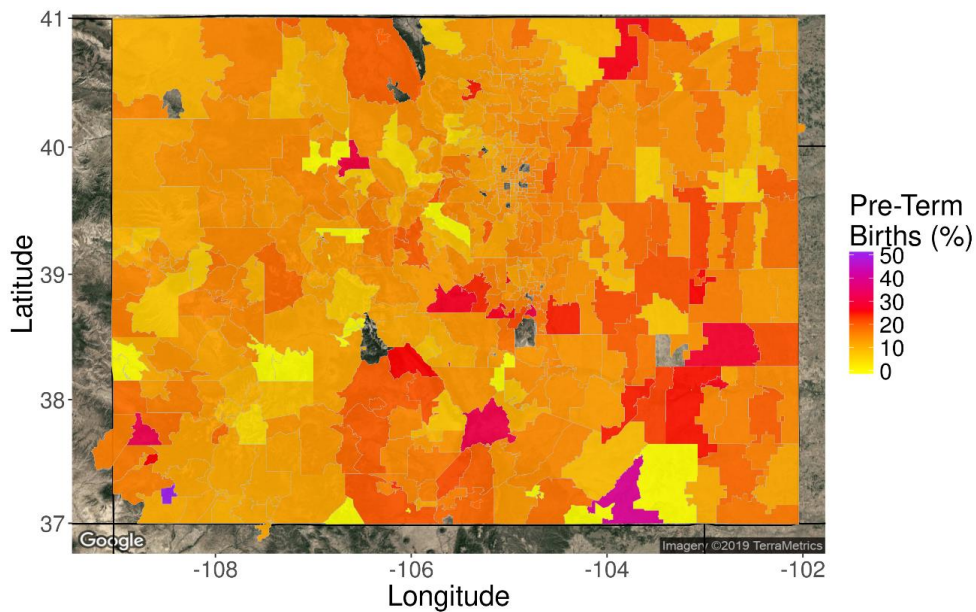


Figure S2. Map of the percentage of pre-term births in each ZIP code, 2007–2015.

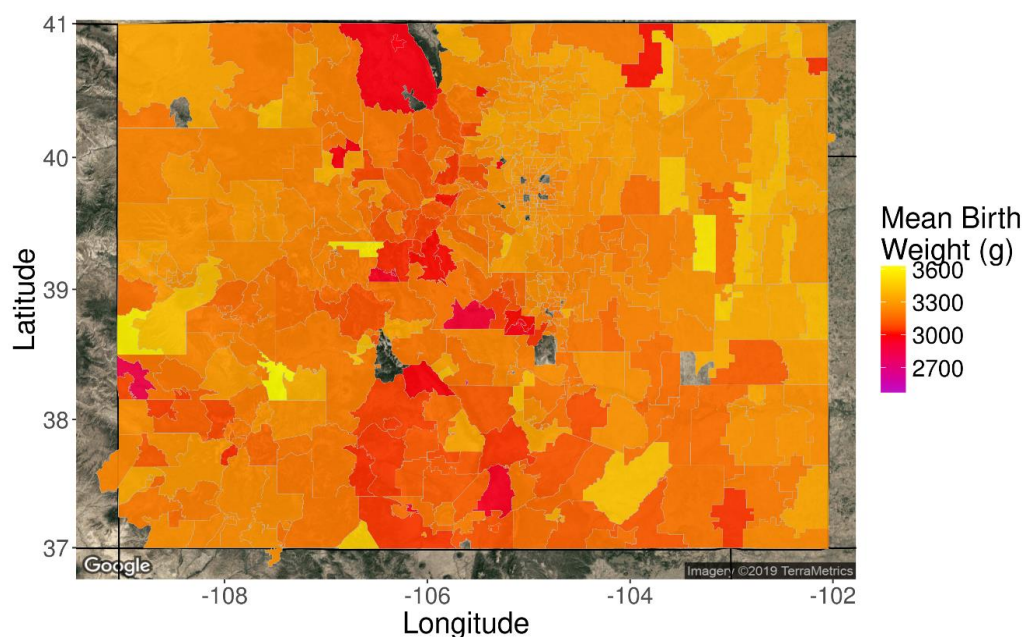


Figure S3. Map of mean birth weight (in grams) in each ZIP code, 2007–2015.

Table S1. Secondary Outcomes.

Secondary Outcome	N	Response	
		No	Yes
Gestational Diabetes	532747	512569	20178
Gestational Hypertension	530842	510775	20067
NICU Admission	535895	501855	34040
Assisted Ventilation	535895	515968	19927
Small for Gestational Age	535822	505115	30707
Low Birth Weight (<2500g)	535822	501694	34128

Table S2. Sensitivity models for the association between wildfire smoke PM_{2.5} (µg/m³) exposure and preterm birth.

Sensitivity Models ¹	Model/Parameter	OR (95%CI)	P-value
Main model without PM₁₀			
	Distributed Lag Model ²		
	First Trimester	0.995 (0.960,1.031)	0.78
	Second Trimester	1.128 (1.086,1.171)	<0.0001
	Third Trimester	0.988 (0.956,1.021)	0.47
	Mean	1.035 (1.016,1.054)	0.0003
	Full Gestation Model ³	1.050 (0.998,1.105)	0.061
Main model without air pollutants except wildfire smoke PM_{2.5}			
	Distributed Lag Model ²		
	First Trimester	0.99 (0.98,1.01)	0.79
	Second Trimester	1.12 (1.10,1.13)	<0.0001
	Third Trimester	0.96 (0.95,0.97)	<0.0001
	Mean	1.02 (1.01,1.03)	<0.0001
	Full Gestation Model ³	1.018 (0.976,1.062)	0.41
Main model with infant gender			
	Distributed Lag Model ²		
	First Trimester	1.024 (0.985,1.064)	0.23
	Second Trimester	1.132 (1.088,1.177)	<0.0001
	Third Trimester	1.013 (0.977,1.050)	0.48
	Mean	1.055 (1.033,1.078)	<0.0001
	Full Gestation Model ³	1.074 (1.015,1.138)	0.014
Main model without temperature			

	Distributed Lag Model ²		
	First Trimester	1.008 (0.972,1.046)	0.65
	Second Trimester	1.104 (1.063,1.146)	<0.0001
	Third Trimester	1.016 (0.983,1.051)	0.35
	Mean	1.042 (1.022,1.062)	<0.0001
	Full Gestation Model ³	1.078 (1.020,1.139)	0.0076
Main model at 5 km buffer			
	Distributed Lag Model ²		
	First Trimester	0.930 (0.789,1.095)	0.38
	Second Trimester	1.225 (1.051,1.427)	0.0096
	Third Trimester	1.116(0.962,1.296)	0.15
	Mean	1.083 (0.991,1.184)	0.078
	Full Gestation Model ³	1.130 (0.904,1.412)	0.28
Main model at 10 km buffer			
	Distributed Lag Model ²		
	First Trimester	0.993 (0.932,1.057)	0.82
	Second Trimester	1.183 (1.109,1.262)	<0.0001
	Third Trimester	1.027 (0.968,1.089)	0.38
	Mean	1.064 (1.029,1.101)	0.0003
	Full Gestation Model ³	1.096 (1.003,1.199)	0.047
Main model at 50 km buffer			
	Distributed Lag Model ²		
	First Trimester	1.007 (0.972,1.043)	0.71
	Second Trimester	1.101 (1.061,1.142)	<0.0001
	Third Trimester	1.004 (0.971,1.038)	0.81
	Mean	1.036 (1.016,1.057)	0.0004
	Full Gestation Model ³	1.057 (1.001,1.115)	0.045
Main model without population weighting of wildfire smoke and non-smoke PM_{2.5}			
	Distributed Lag Model ²		
	First Trimester	1.024 (0.986,1.065)	0.22
	Second Trimester	1.133 (1.089,1.178)	<0.0001
	Third Trimester	1.014 (0.978,1.051)	0.47
	Mean	1.055 (1.033,1.078)	<0.0001
	Full Gestation Model ³	1.076 (1.016,1.139)	0.012

¹Main model adjusted for: Ozone, non-wildfire PM_{2.5}, PM₁₀, temperature deviation, calendar month, year, mother's race/ethnicity, mother's education and income, mother's age, smoking during pregnancy, drinking during pregnancy, asthma, and gindex. The main model used co-exposure data calculated using the 20 km buffer.

²Model includes trimester-specific parameters for wildfire smoke PM_{2.5}, non-wildfire PM_{2.5}, PM₁₀, ozone, and temperature deviation.

³Model includes a single, full gestation parameter each for wildfire smoke PM_{2.5}, non-wildfire PM_{2.5}, PM₁₀, ozone, and temperature deviation.

Table S3. Sensitivity models for the association between wildfire smoke PM_{2.5} (µg/m³) exposure and birth weight (g).

Sensitivity Models ¹	Model/Parameter	Estimate (95%CI)	P-value
Main model without PM₁₀			
	Distributed Lag Model ²		
	First Trimester	-4.52 (-9.46, 0.43)	0.074
	Second Trimester	4.58 (-0.73, 9.88)	0.09
	Third Trimester	-0.59 (-5.17, 3.99)	0.80
	Mean	-0.18 (-2.74, 2.38)	0.89
	Full Gestation Model ³	1.26 (-5.79, 8.31)	0.73
Main model without air pollutants except wildfire smoke PM_{2.5}			
	Distributed Lag Model ²		
	First Trimester	-3.54 (-7.83, 0.75)	0.110
	Second Trimester	2.59 (-1.91, 7.08)	0.26
	Third Trimester	-1.16 (-4.94, 2.62)	0.55
	Mean	-0.71 (-2.71, 1.30)	0.49
	Full Gestation Model ³	-0.92 (-6.86, 5.01)	0.76
Main model with infant gender			
	Distributed Lag Model ²		
	First Trimester	-5.69 (-10.97, -0.41)	0.040

	Second Trimester	2.47 (-3.07, 8.01)	0.38
	Third Trimester	-3.61 (-8.51, 1.30)	0.15
	Mean	-2.28 (-5.19, 0.64)	0.13
Main model without temperature	Full Gestation Model ³	-2.70 (-10.51, 5.10)	0.50
	Distributed Lag Model ²		
	First Trimester	-4.57 (-9.65, 0.51)	0.080
	Second Trimester	5.26 (-0.04, 10.55)	0.050
	Third Trimester	-1.76 (-6.38, 2.86)	0.45
	Mean	-0.36 (-3.01, 2.29)	0.80
	Full Gestation Model ³	0.024 (-7.56, 7.60)	0.99
Main model at 5 km buffer			
	Distributed Lag Model ²		
	First Trimester	-7.03 (-29.18, 1 5.13)	0.53
	Second Trimester	10.96 (-11.12, 33.03)	0.33
	Third Trimester	-3.63 (-24.68, 17.42)	0.74
	Mean	0.10 (-12.14, 12.34)	0.99
	Full Gestation Model ³	2.76 (-28.04, 33.56)	0.86
Main model at 10 km buffer			
	Distributed Lag Model ²		
	First Trimester	-2.88 (-11.51, 5.76)	0.51
	Second Trimester	4.10 (-5.04, 13.25)	0.38
	Third Trimester	-2.54 (-10.66, 5.57)	0.54
	Mean	-0.44 (-5.07, 4.19)	0.85
	Full Gestation Model ³	2.21 (-10.05, 14.47)	0.72
Main model at 50 km buffer			
	Distributed Lag Model ²		
	First Trimester	-3.88 (-8.77, 1.02)	0.120
	Second Trimester	2.64 (-2.61, 7.89)	0.32
	Third Trimester	-2.70 (-7.34, 1.94)	0.25
	Mean	-1.31 (-4.04, 1.41)	0.35
	Full Gestation Model ³	-1.03 (-8.50, 6.44)	0.79
Main model without population weighting of wildfire smoke and non-smoke PM_{2.5}			
	Distributed Lag Model ²		
	First Trimester	-5.92 (-11.27, -0.58)	0.03
	Second Trimester	3.08 (-2.54, 8.70)	0.28
	Third Trimester	-3.34 (-8.31, 1.64)	0.19
	Mean	-2.06 (-5.01, 0.89)	0.17
	Full Gestation Model ³	-2.09 (-10.0, 5.83)	0.61

¹Main model adjusted for: Ozone, non-wildfire PM_{2.5}, PM₁₀, temperature deviation, calendar month, year, mother's race/ethnicity, mother's education and income, mother's age, smoking during pregnancy, drinking during pregnancy, asthma, gindex, and gestational age. The main model used co-exposure data calculated using the 20 km buffer.

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